

REMARKS

Claim 13 is pending and under examination.

Applicant respectfully traverses the rejection of claim 13 under 35 U.S.C. § 103(a) over U.S. Patent No. 6,736,991 to Cohen et al. ("Cohen") in view of U.S. Patent 6,231,782 to Shimomura et al. ("Shimomura") for at least the following reasons, as corroborated by the Declaration of Mr. Katsuya Takigawa under 37 C.F.R. § 1.132. ("the Declaration").

A reasonable expectation of success is required to support a conclusion of obviousness. M.P.E.P. § 2143.02. In order to have a reasonable expectation of success, at least some degree of predictability is required. M.P.E.P. § 2143.02(II).

Applicant respectfully submits that the refrigerating machine oil as recited in claim 13 shows the unexpected beneficial results for which no degree of predictability or reasonable expectation of success existed in the cited references. The present application discloses Examples 4-6, which correspond to the refrigerating machine oil recited in claim 13. See as-filed specification, paragraph [0129]. Specifically, each refrigerating machine oil composition set forth in Examples 4-6 includes a combination of the mineral oil, phosphorothionate, and phosphoric acid ester as recited in claim 13. As shown in Tables 2-3, Examples 4-6 (according to the claimed composition) showed marked improvement in wear resistance from the synergistic effect of the combination of the phosphorothionate (A2) and the phosphoric acid ester (A1), as compared with Example 15, which included only the phosphoric acid ester (A1), and Example 16, which included only the phosphorothionate (A2). See Reply to Office Action filed April 7, 2011, pages 4-5; see *a/so* the Declaration, paragraph 6.

Neither Cohen nor Shimomura discloses or suggests such an improvement in wear resistance from the synergistic effect of the combination of the phosphorothionate (A2) and the phosphoric acid ester (A1). First, neither of the references discloses or suggests a combination of phosphorothionate and phosphoric acid ester as required by claim 13. Cohen at column 7, line 3-5, discloses anti-wear compounds for refrigeration [being] alkyl-aryl or tri-aryl phosphates," but fails to disclose or suggest the specific combination of phosphorothionate and phosphoric acid ester. The Office Action relied on Shimomura to allegedly teach "a phosphorothionate." Office Action at 3. Shimomura at col. 9, lines 25-31 discloses several phosphorous compounds to be added to a refrigerating machine oil composition, but fails to disclose or suggest the combination of phosphorothionate and phosphoric acid ester, as claimed. In the absence of the combination of phosphorothionate and phosphoric acid ester, considering Yokota or King, respectively, one of ordinary skill in the art would not have expected such beneficial results of the claimed oil compositions. See the Declaration paragraph 7.

The Office Action asserted that "Applicants have not compared their formulations against the closed prior art therefore not demonstrating unexpected results." This assertion is inapposite. See M.P.E.P. 716.02(e)(III) (although evidence of unexpected results must compare the claimed invention with the closest prior art, applicant is not required to compare the claimed invention with subject matter that does not exist in the prior art.). The closest art relied on by the Office Action is Cohen. As noted above, Cohen neither discloses nor suggests a "phosphorothionate" or a combination of phosphorothionate and phosphoric acid ester, as required by claim 13. Accordingly,

Cohen may not even be as close to the claim as Example 15, which included only the phosphoric acid ester (A1), or at most may be as close as Example 15. Accordingly, the above-discussed comparison between Examples 4-6 with Examples 15-16 sufficiently meets the M.P.E.P. guidelines for "comparison with the closest prior art."

Moreover, requiring applicant to compare claimed invention with a compound suggested by the combination of references relied upon in the rejection of the claimed invention under 35 U.S.C. 103 "would be requiring comparison of the results of the invention with the results of the invention." M.P.E.P. 716.02(e)(III) (citing *In re Chapman*, 357 F.2d 418, 422 (CCPA 1966)). Applicant is not required to compare the claim with the hypothetical combination of Cohen and Shimomura to support the unexpected beneficial results arguments. Combining Cohen and Shimomura therefore would not have been considered as one of a finite number of known solutions for problems recognized as in the present application, with predictable results.

The Office Action also asserted that "examples oils 4-14 merely demonstrate that the higher concentration of additives the lower the coefficient of friction. . . . [T]he oiliness improver (additive C) from the Tables . . . do lower coefficient of frictions and therefore adding these additives to a base oil to lower the coefficient of friction is hardly unexpected. Also, none of the additional additives, namely B1 and C1-5 from the Tables 2-3 of the instant specification, are reflected in instant claim 13." Office Action at 5. These assertions are improper as explained below.

Applicant has provided the unexpected beneficial results arguments based on the comparison between Examples 4-6 and Examples 15 and 16. See Reply to Office Action filed April 7, 2011, page 4. As discussed above, Examples 4-6, comprising both

phosphoric acid ester and phosphorothionate, but not including either oiliness improvers (additive C) or epoxy compound (additive B1), are commensurate with the scope of claim 13. Although Examples 4-6 do not include additive C or B1, they showed lower coefficients of friction compared to Examples 15 and 16. Even in Example 4, the coefficient of friction is lower than that of Examples 15 and 16. The total content of A1 and A2 in each of Example 4-6 is the same as the content of A1 in Example 15, and the content of A2 in Example 16. Accordingly, by the combination of phosphoric acid ester and phosphorothionate, as required by claim 13, superior property, i.e., lower coefficients of frictions can be obtained. See the Declaration, paragraph 9. The Office Action's alleged comparison among Examples 4-14 and further assertion regarding adding additives B or C1-5 do not relate to the Applicant's unexpected beneficial results from the synergistic combination of phosphoric acid ester and phosphorothionate, based on comparison of Examples 4-6 and Examples 15 and 16.

Claim 13 also recites, among other things, "a mineral oil obtained by hydrotreating and/or hydrotreatment of not less than 93.5 % by mass; . . . wherein a nitrogen content in the mineral oil is no more than 20 ppm by mass, a percentage of aromatic ring structure (%C_A) in the mineral oil is from 10 to 15, a sulfur content in the mineral oil is no more than 48 ppm by mass, and a kinematic viscosity of the mineral oil at 40 °C is 55.5-57.2 mm²/s."

In response to the Applicant's arguments that Cohen neither discloses nor suggests a mineral oil as required by claim 13 (See April 7, 2011 Reply, pages 5-6), the Office Action asserted that "based on the entire disclosure of Cohen there is a likelihood that a base oil is disclosed with low sulfur content less than 48 ppm and that same base

oil having an aromatic content of greater than 8 based on the disclosure of Cohen."

Office Action at 6. These assertions are improper. The mineral oil composition as disclosed in Cohen differs from the composition required by claim 13, and one of ordinary skill in the art would not have considered to modify the disclosed mineral oil composition of Cohen to arrive at the claimed composition with a reasonable expectation of success, as further explained below and also set forth in the Declaration at paragraphs 11-13.

The example oils disclosed in Cohen have a sulfur content of 200 ppm or 300 ppm and %C_A of 14 or 12 (Cohen, col. 3, Table 1); and if these oils are filtered to reduce sulfur and nitrogen contents and the respective concentrations of both sulfur and nitrogen have been reduced to level of 50 ppm or lower, %C_A must also be reduced to be out of the claimed range of 8-15 (perhaps down to 0). In Cohen, sulfur and nitrogen compounds in the mineral oil are present as aromatic compound. The purification method of oil in Cohen is that contacting the oil with sulfuric acid to remove the sulfur and nitrogen compounds by oxidative degradation and condensation polymerization, and further removing the sulfur and nitrogen compounds with the aid of absorbent such as claim or bauxite which absorbs polar materials such as sulfur and nitrogen compounds. In Cohen, therefore, removing sulfur compound and nitrogen compound in mineral oil means removing aromatic compound. There is a high possibility that naphthenic mineral oil in Cohen has aromatic content (%C_A) of no more than 8 when its sulfur content is no more than 48 ppm, in contrast to "a percentage of aromatic ring structure (%C_A) in the mineral oil is from 10 to 15, a sulfur content in the mineral oil is no more than 48 ppm by mass."

In contrast, in purification methods by hydrotreating or hydrorefining, as required by claim 13, aromatic compounds containing sulfur and nitrogen react and combine with hydrogen, and sulfur may be removed as hydrogen sulfide, nitrogen may be removed as amine compound while aromatic moiety can remain the same.

For these reasons, if the example oils disclosed in Cohen having a sulfur content of 200 ppm or 300 ppm and %C_A of 14 or 12 (Cohen, col. 3, Table 1) are filtered such that the sulfur contents are reduced to "no more than 48 ppm," as recited in claim 13, then %C_A must be reduced to be out of the claimed range of 10-15. Accordingly, Cohen neither discloses nor suggests a mineral oil as recited in claim 13.

For at least the above reasons, claim 13 is allowable over Cohen in view of Shimomura.

In view of the foregoing remarks, Applicant respectfully requests reconsideration of this application, withdrawal of the rejections, and timely allowance of the pending claims.

Should the Examiner have any comments or questions, please contact the Applicant's representative at (202)408-4457.

Please grant any extensions of time required to enter this response and charge any additional required fees to Deposit Account 06-0916.

Respectfully submitted,

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Dated: August 5, 2011

By: /Hojung Cho/
Hojung Cho
Ltd. Rec. No. L0596

Attachment: Declaration of Mr. Katsuya Takigawa under 37 C.F.R. § 1.132